

NOTICE OF REVISION (NOR)		1. DATE (YYMMDD) 96-06-26		Form Approved OMB No. 0704-0188	
THIS REVISION DESCRIBED BELOW HAS BEEN AUTHORIZED FOR THE DOCUMENT LISTED.					
<small>Public reporting burden for this collection is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503. PLEASE DO NOT RETURN YOUR COMPLETED FORM TO EITHER OF THESE ADDRESSED. RETURN COMPLETED FORM TO THE GOVERNMENT ISSUING CONTRACTING OFFICER FOR THE CONTRACT/ PROCURING ACTIVITY NUMBER LISTED IN ITEM 2 OF THIS FORM.</small>				2. PROCURING ACTIVITY NO.	
				3. DODAAC	
4. ORIGINATOR		b. ADDRESS (Street, City, State, Zip Code) Defense Electronics Supply Center 1507 Wilmington Pike Dayton, OH 45444-5765		5. CAGE CODE 67268	
a. TYPED NAME (First, Middle Initial, Last)				7. CAGE CODE 67268	
				6. NOR NO. 5962-R160-96	
				8. DOCUMENT NO. 86020	
9. TITLE OF DOCUMENT MICROCIRCUIT, 256-BIT LOW POWER SCHOTTKY BIPOLAR RAM, MONOLITHIC SILICON			10. REVISION LETTER		11. ECP NO. N/A
			a. CURRENT A	b. NEW B	
12. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES All					
13. DESCRIPTION OF REVISION <p>Sheet 1: Revisions ltr column; delete "A" and add "B". Revisions description column; add "Changes in accordance with NOR 5962-R160-96". Revisions date column; add "96-06-26". Rev status above sheet numbers 1, delete "A" and add "B". Revision level block; delete "A" and Add "B".</p> <p>On sheet 1 in the open area between the Revision information and above the first row of REV blocks; write in bold lettering the following: "CURRENT CAGE CODE 67268".</p>					
14. THIS SECTION FOR GOVERNMENT USE ONLY					
a. (X one)		(1) Existing document supplemented by the NOR may be used in manufacture. (2) Revised document must be received before manufacturer may incorporate this change. (3) Custodian of master document shall make above revision and furnish revised document.			
X					
b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT DESC-ELDS			c. TYPED NAME (First, Middle Initial, Last) Michael A. Frye		
d. TITLE Microelectronics Branch Chief		e. SIGNATURE Michael A. Frye		f. DATE SIGNED (YYMMDD) 96-06-26	
15a. ACTIVITY ACCOMPLISHING REVISION DESC-ELDS		b. REVISION COMPLETED (Signature) Kenneth S. Rice		c. DATE SIGNED (YYMMDD) 96-06-26	

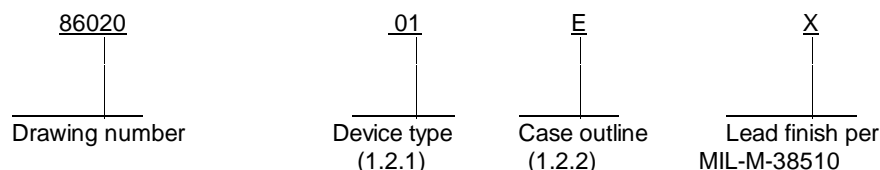
REVISIONS																			
LTR	DESCRIPTION									DATE (YR-MO-DA)					APPROVED				
A	Remove vendor CAGE 34335 for device type 04. Change to military drawing format. Editorial changes throughout.									2 July 1987					N A Hauck				
REV																			
SHEET																			
REV	A																		
SHEET	15																		
REV STATUS OF SHEETS				REV		A	A	A	A	A	A	A	A	A	A	A	A	A	A
				SHEET		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Defense Electronics Supply Center Dayton, Ohio				PREPARED BY Rick C. Officer					MILITARY DRAWING This drawing is available for use by all Departments and Agencies of the Department of Defense										
				CHECKED BY D A Di Cenzo															
				APPROVED BY N A Hauck					TITLE: MICROCIRCUITS, 256-BIT LOW POWER SCHOTTKY BIPOLAR RAM, MONOLITHIC SILICON										
				SIZE A	CODE IDENT. NO. 14933														
				Original date of drawing: 15 February 1986				REVISION LEVEL A					DWG NO. 86020						
AMSC N/A									SHEET 1 OF 15										

5962-E415

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883 "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part number. The complete part number shall be as shown in the following example:



1.2.1 Device types. The device types shall identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit</u>	<u>Access time</u>
01	27LS00	256-bit low power Schottky bipolar RAM three-state	55 ns
02	27LS00A	256-bit low power Schottky bipolar RAM three-state	45 ns
03	27LS01	256-bit low power Schottky bipolar RAM open collector	55 ns
04	27LS01A	256-bit low power Schottky bipolar RAM open collector	45 ns

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

<u>Outline letter</u>	<u>Case outline</u>
E	D-2 (16-lead, 1/4" x 7/8"), dual-in-line package
F	F-5 (16-lead, 1/4" x 3/8"), flat package

1.3 Absolute maximum ratings.

Supply voltage range	..... -0.5 V dc to +7.0 V dc
Input voltage range	..... -0.5 V dc to +5.5 V dc
Storage temperature range	..... -65° C to +150° C
Maximum power dissipation (P_D) ^{1/}	..... 1.6 W
Lead temperature (soldering, 10 seconds)	..... +300° C
Thermal resistance, junction-to-case (θ_{JC}):	
Case E	..... (See MIL-M-38510, appendix C)
Case F	..... (See MIL-M-38510, appendix C)
Junction temperature (T_J)	..... +175° C
Output current, inputs	..... 30 mA
DC input current	..... -30 mA to +5 mA

1.4 Recommended operating conditions.

Supply voltage (V_{CC})	..... 4.5 V dc minimum to 5.5 V dc maximum
Minimum high-level input voltage (V_{IH})	..... 2.0 V dc
Maximum low-level input voltage (V_{IL})	..... 0.8 V dc
Case operating temperature range (T_C) -55° C to +125° C

^{1/} Must withstand the added P_D due to short circuit test (e.g., I_{OS}).

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2. APPLICABLE DOCUMENTS

2.1 Government specification and standard. Unless otherwise specified, the following specification and standard, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of the specification and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Truth table. The truth table shall be as specified on figure 2.

3.2.3 Logic diagrams. The logic diagrams shall be as specified on figure 3.

3.2.4 Case outlines. The case outlines shall be in accordance with 1.2.2.

3.3 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table I and apply over the full recommended case operating temperature range.

3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

3.5 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.6 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$ $4.5\text{ V} \leq V_{CC} \leq 5.5\text{ V}$	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Output high voltage	V_{OH}	$V_{CC} = \text{minimum}$ $I_{OH} = -2.0\text{ mA}$ $V_{IN} = V_{IH} \text{ or } V_{IL}$	1, 2, 3	01, 02	2.4		V
Output low voltage	V_{OL}	$V_{CC} = \text{minimum}$ $I_{OL} = 16\text{ mA}$ $V_{IN} = V_{IH} \text{ or } V_{IL}$	1, 2, 3	All		0.45	V
Input high level	V_{IH}	Guaranteed input logical high voltage for all inputs <u>1</u> /	1, 2, 3	All	2.0		V
Input low level	V_{IL}	Guaranteed input logical low voltage for all inputs <u>1</u> /	1, 2, 3	All		0.8	V
Input low current	I_{IL}	$V_{CC} = \text{maximum}$ $V_{IN} = 0.4\text{ V}$	1, 2, 3	All		-0.25	mA
Input high current	I_{IH}	$V_{CC} = \text{maximum}$ $V_{IN} = 2.7\text{ V}$	1, 2, 3	All		20	μA
Output short circuit current	I_{OS}	$V_{CC} = \text{maximum}$ $V_{OUT} = 0.0\text{ V}$	1, 2, 3	01, 02	-20	-60	mA
Power supply current	I_{CC}	All inputs = GND V_{CC} = Maximum	1, 2, 3	02, 04		115	mA
				01, 03		70	
Input clamp voltage	V_{CL}	$V_{CC} = \text{Minimum}$, $I_{IN} = -18\text{ mA}$	1, 2, 3	All		-1.2	V
Output leakage current	I_{CEX}	$V_{CS} = V_{IH} \text{ or } V_{WE} = V_{IL}$ $V_{OUT} = 2.4\text{ V}$	1, 2, 3	All		30	μA
		$V_{CS} = V_{IH} \text{ or } V_{WE} = V_{IL}$ $V_{OUT} = 0.4\text{ V}$ $V_{CC} = \text{maximum}$	1, 2, 3	01, 02	-30		μA

See footnote at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55° C ≤ T _C ≤ +125° C 4.5 V ≤ V _{CC} ≤ 5.5 V	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Delay from address to output	t _{PLH} (A) t _{PHL} (A)	See figure 4 <u>2/</u> <u>3/</u> <u>4/</u>	9, 10, 11	01, 03		55	ns
				02, 04		45	
Delay from chip select (low) to active output and correct data	t _{PZH} (CS) <u>5/</u> - t _{PZL} (CS) <u>5/</u>		9, 10, 11	01, 03		30	ns
				02, 04		25	
Delay from write enable (high) to active output and correct data	t _{PZH} (WE) <u>5/</u> - t _{PZL} (WE) <u>5/</u>	See figures 4, 5, and 6 <u>2/</u> <u>3/</u> <u>4/</u>	9, 10, 11	01, 03		55	ns
				02, 04		45	
				01, 03		55	
				02, 04		45	
Setup time address (prior to initiation of write)	t _S (A)		9, 10, 11	All	5		ns
Hold time address (after termina- tion of write)	t _H (A)		9, 10, 11	All	5		ns
Setup time data input (prior to termination of write)	t _S (DI)		9, 10, 11	01, 03	35		ns
				02, 04	30		ns
Hold time data input (after termination of write)	t _H (DI)		9, 10, 11	All	5		ns
Minimum write enable pulse width to insure write	t _{pw} (WE)		9, 10, 11	01, 03	35		ns
				02, 04	30		ns

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$ $4.5\text{ V} \leq V_{CC} \leq 5.5\text{ V}$	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Delay from chip select (high) to inactive output (HI-Z)	$t_{PHZ}(\text{CS})$	See figure 4 <u>2/ 3/ 4/</u>	9, 10, 11	01, 03		30	ns
	$t_{PLZ}(\text{CS})$			02, 04		25	ns
Delay from write enable (low) to inactive output (HI-Z)	$t_{PLZ}(\text{WE})$		9, 10, 11	All		40	ns
	$t_{PHZ}(\text{WE})$						

- 1/ These are absolute voltages with respect to device ground pin and include all overshoots due to system or tester noise, or both. Do not attempt to test these values without suitable equipment.
- 2/ Output is preconditioned to data in during write to ensure correct data is present on all outputs when write is terminated. (No write recovery glitch).
- 3/ $t_{PLH}(\text{A})$ and $t_{PHL}(\text{A})$ are tested with S closed and $C_L = 50\text{ pF}$ with both input and output timing referenced to 1.5 V.
- 4/ For open collector (03, 04), all delays from write enable (WE) or chip select (CS) inputs to the data output (D_{OUT}), $t_{PLZ}(\text{WE})$, $t_{PLZ}(\text{CS})$, $t_{PZL}(\text{WE})$, and $t_{PZL}(\text{CS})$ are measured with S closed and $C_L = 50\text{ pF}$ and with both the input and output timing referenced to 1.5 V.
- 5/ For three-state output (01, 02) $t_{PZH}(\text{WE})$ and $t_{PZH}(\text{CS})$ are measured with S open, $C_L = 50\text{ pF}$ and with both the input and output timing referenced to 1.5 V. $t_{PZL}(\text{WE})$ and $t_{PZL}(\text{CS})$ are measured with S closed, $C_L = 50\text{ pF}$ and with both the input and output timing referenced to 1.5 V. $t_{PHZ}(\text{WE})$ and $t_{PHZ}(\text{CS})$ are measured with S open and $C_L < 5\text{ pF}$ and are measured between the 1.5 V level on the input to the $V_{OH} - 500\text{ mV}$ level on the output. $t_{PLZ}(\text{WE})$ and $t_{PLZ}(\text{CS})$ are measured with S closed and $C_L < 5\text{ pF}$ and are measured between the 1.5 V level on the input and the $V_{OL} + 500\text{ mV}$ level on the output.

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3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.8 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

- a. Burn-in test (method 1015 of MIL-STD-883).
 - (1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
- b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

- a. Tests shall be as specified in table II herein.
- b. Subgroups 4, 5, and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.
- c. Subgroup 4 (C_{IN} measurement) shall be measured only for the initial test and after process or design changes which may affect input capacitance.

4.3.2 Groups C and D inspections.

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test (method 1005 of MIL-STD-883) conditions:
 - (1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by appendix B of MIL-M-38510 and method 1005 of MIL-STD-883.

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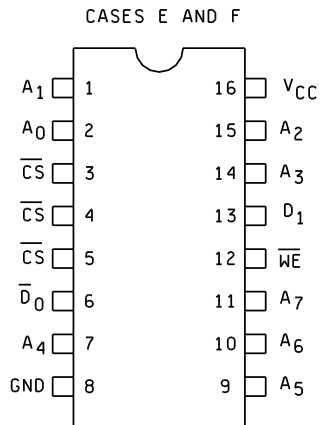


FIGURE 1. Terminal connections.

Input			Data output Status $\overline{D0}$ ($t_n + 1$)	Mode
\overline{CS}	\overline{WE}	D1		
H	X	X	Output disabled	No selection
L	L	L	Output disabled	Write '0'
L	L	H	Output disabled	Write '1'
L	H	X	Selected bit (inverted)	Read

H = High
L = Low
X = Don't care

FIGURE 2. Truth table.

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DEVICE TYPES 01 AND 02

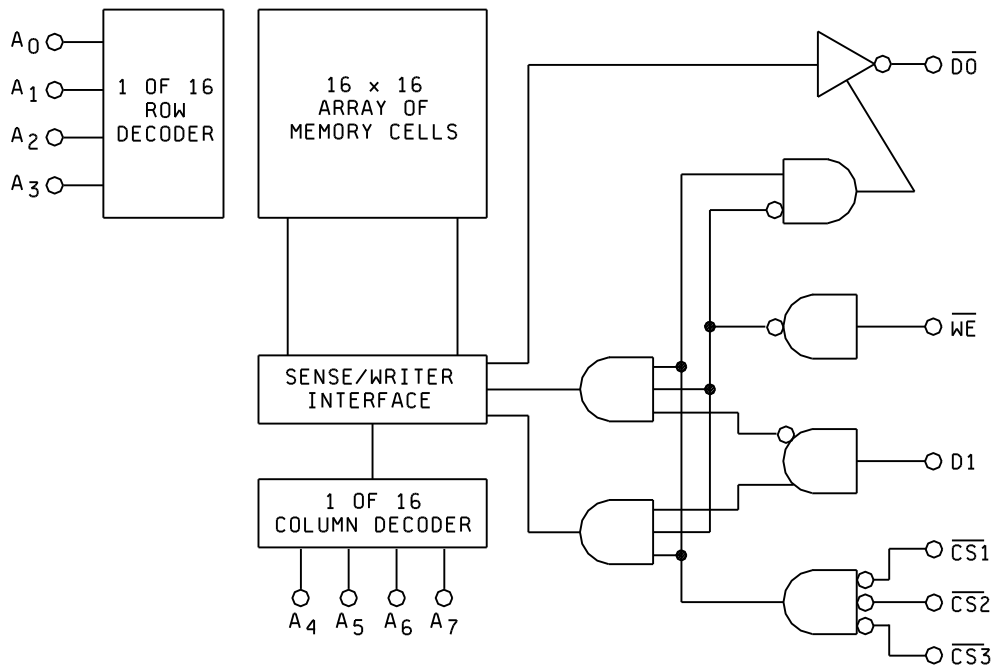


FIGURE 3. Logic diagrams.

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DEVICE TYPES 03 AND 04

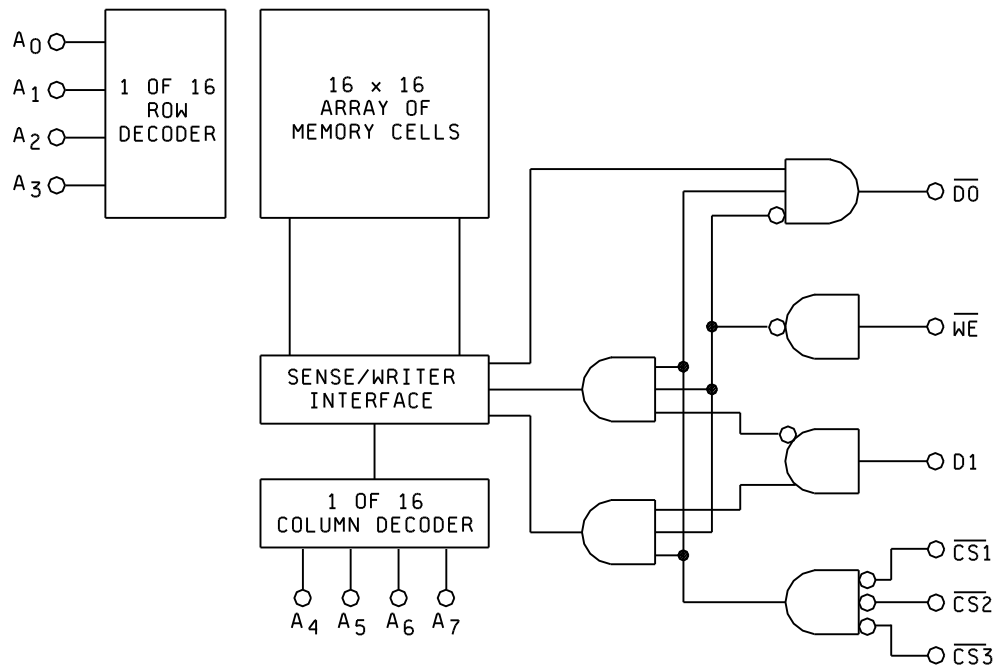


FIGURE 3. Logic diagrams - Continued.

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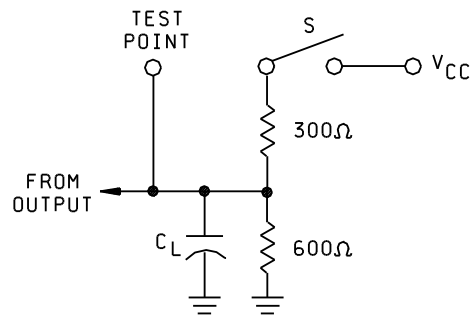


FIGURE 4. Switching test circuit.

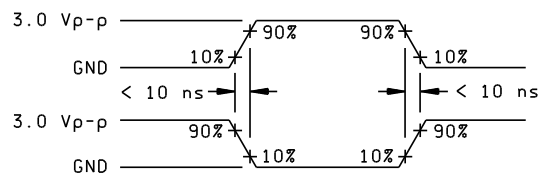


FIGURE 5. Switching test waveform.

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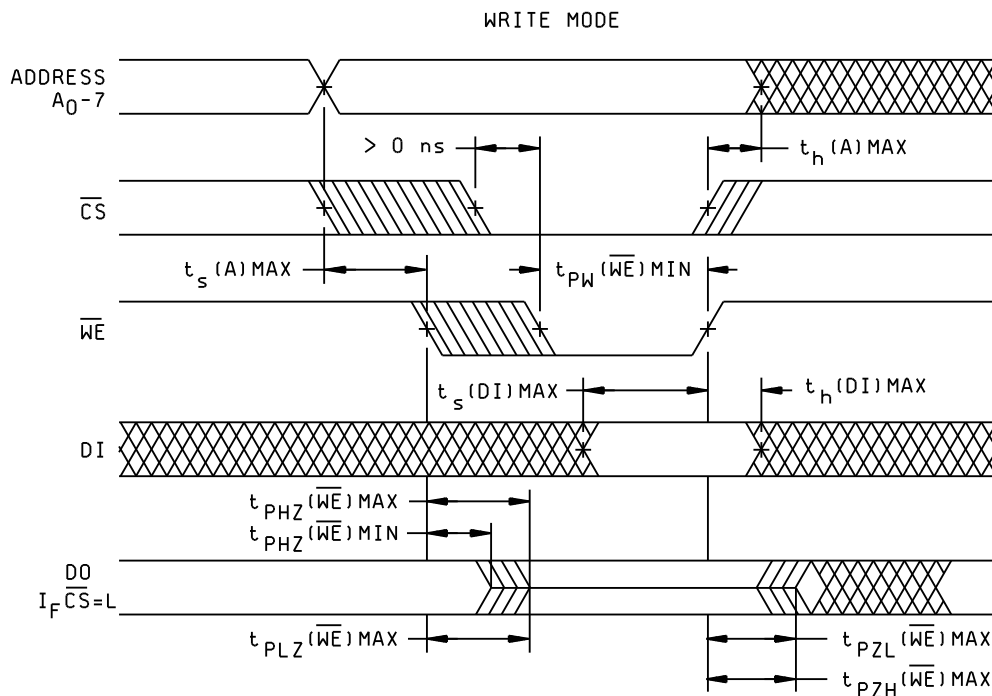
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Write Cycle Timing. The cycle is initiated by an address change. After $t_s(A) \text{ max}$, the write enable may begin. The chip select must also be LOW for writing. Following the write pulse, $t_h(A) \text{ max}$ must be allowed before the address may be changed again. The output will be inactive (floating for device types 01 and 02) while the write enable is LOW. Ordinarily, the chip select should be LOW during the entire write pulse.

FIGURE 6. Switching waveforms.

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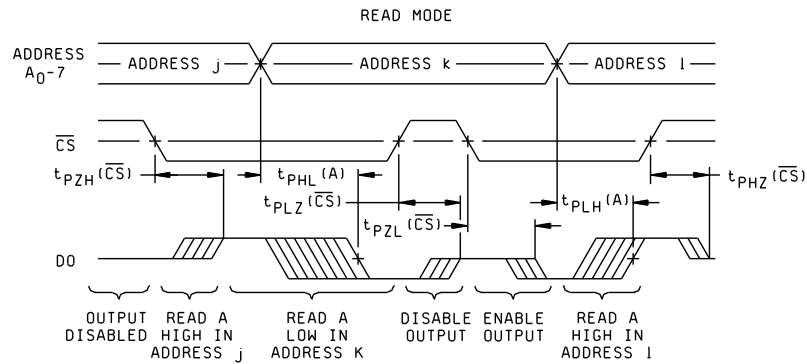
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Switching delays from address and chip select inputs to the data output. For devices 01 and 02, disabled output is "OFF", represented by a single center line. For devices 03 and 04 a disabled output is HIGH.

KEY TO SWITCHING WAVEFORMS

WAVEFORM	INPUT	OUTPUT
	MUST BE STEADY	WILL BE STEADY
	MAY CHANGE FROM H TO L	WILL BE CHANGING FROM H TO L
	MAY CHANGE FROM L TO H	WILL BE CHANGING FROM L TO H
	DON'T CARE: ANY CHANGE PERMITTED	CHANGING STATE UNKNOWN
	DOES NOT APPLY	CENTER LINE IS HIGH IMPEDANCE "OFF" STATE

FIGURE 6. Switching waveforms - Continued.

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TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*, 2, 3, 7, 8, 9, 10, 11**
Group A test requirements (method 5005)	1, 2, 3, 7, 8, 9, 10, 11**
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3
Additional electrical subgroups for group C periodic inspections	---

* PDA applies to subgroup 1.

** Subgroups 10 and 11, if not tested, shall be guaranteed to the specified limits in table I. Subgroups 7 and 8 shall consist of verifying the truth table specified on figure 2.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

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6.4 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.5 herein) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number <u>1/</u>	Replacement military specification part number
8602001EX	34335	AM27LS00/BEA	---
8602001FX	34335	AM27LS00/BFA	---
8602002EX	34335	AM27LS00A/BEA	---
8602002FX	34335	AM27LS00A/BFA	---
8602003EX	34335	AM27LS01/BEA	---
8602003FX	34335	AM27LS01/BFA	---
8602004EX	<u>2/</u>	AM27LS01A/BEA	---
8602004FX	<u>2/</u>	AM27LS01A/BFA	---

1/ Caution: Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

2/ Not available from an approved source of supply.

Vendor CAGE
number

34335

Vendor name
and address

Advanced Micro Devices, Incorporated
901 Thompson Place
P. O. Box 3453
Sunnyvale, CA 94088

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